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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/717,303	11/19/2003	James Economy	ILL04-030-US	6472
43320	7590	02/06/2006	EXAMINER	
EVAN LAW GROUP LLC 566 WEST ADAMS, SUITE 350 CHICAGO, IL 60661			STAIKOVICI, STEFAN	
			ART UNIT	PAPER NUMBER
			1732	

DATE MAILED: 02/06/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b>	<b>Applicant(s)</b>	
	10/717,303	ECONOMY ET AL.	
	<b>Examiner</b>	<b>Art Unit</b>	
	Stefan Staicovici	1732	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 11 January 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-37 is/are pending in the application.
- 4a) Of the above claim(s) 14-19 and 25-37 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-13 and 20-24 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☒ Claim(s) 1-37 are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 07 June 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)  | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date <u>3/29/04; 9/20/04</u> . | 6) <input type="checkbox"/> Other: _____  |

## **DETAILED ACTION**

### ***Election/Restrictions***

1. In view of Applicants' remarks filed January 11, 2006 the restriction requirement mailed December 7, 2005 is withdrawn and a new restriction is made as follows.
2. Restriction to one of the following inventions is required under 35 U.S.C. 121:
  - I. Claims 1-13 and 20-24, drawn to a molding process, classified in class 264, subclass 109.
  - II. Claims 14-19 and 25-31, drawn to a fiber composite, classified in class 428, subclass 427.
  - III. Claims 32-33, drawn to an aircraft brake, classified in class 188, subclass various.
  - IV. Claim 34-35, drawn to an aircraft, classified in class 244, subclass various.
  - V. Claims 36-37, drawn to a method of decelerating an aircraft, classified in class 118, subclass various.

The inventions are distinct, each from the other because of the following reasons:

3. Inventions Groups I and, II, III and IV are related as process of making and product made. The inventions are distinct if either or both of the following can be shown: (1) that the process as claimed can be used to make other and materially different product or (2) that the product as claimed can be made by another and materially different process (MPEP § 806.05(f)). In the instant case, the product as claimed can be made by another and materially different process such as mixing boron nitride, organic binder, carbon fiber and water to form a mixture

and shaping said mixture in a mold under heat and pressure to form a composite, a composite as part of an aircraft brake or a composite as part of an aircraft.

4. Inventions Groups I and V are unrelated. Inventions are unrelated if it can be shown that they are not disclosed as capable of use together and they have different modes of operation, different functions, or different effects (MPEP § 806.04, MPEP § 808.01). In the instant case the different inventions have different modes of operation, specifically Group I requires mixing, heating and molding, whereas Group V requires a molded product and does not include any requirement as to the process of making said molded product, hence the processes are not usable together and have different effects.

5. Inventions Groups II and, III and IV are related as subcombinations disclosed as usable together in a single combination. The subcombinations are distinct from each other if they are shown to be separately usable. In the instant case, invention Group II has separate utility such as a clutch, an automobile break or a heat-shield. See MPEP § 806.05(d).

6. Inventions Groups II and V are related as product and process of use. The inventions can be shown to be distinct if either or both of the following can be shown: (1) the process for using the product as claimed can be practiced with another materially different product or (2) the product as claimed can be used in a materially different process of using that product (MPEP § 806.05(h)). In the instant case the product as claimed can be used in a materially different process of using that product such as, decelerating an automobile, shifting gears or protecting a structure from heating upon atmospheric re-entry.

7. Inventions Group III and IV are related as combination and subcombination. Inventions in this relationship are distinct if it can be shown that (1) the combination as claimed does not require the particulars of the subcombination as claimed for patentability, and (2) that the subcombination has utility by itself or in other combinations (MPEP § 806.05(c)). In the instant case, the combination as claimed does not require the particulars of the subcombination as claimed as evidenced by claims 17 or 27. The subcombination has separate utility such as a clutch or an automobile break.

8. Inventions Group III and V are related as product and process of use. The inventions can be shown to be distinct if either or both of the following can be shown: (1) the process for using the product as claimed can be practiced with another materially different product or (2) the product as claimed can be used in a materially different process of using that product (MPEP § 806.05(h)). In the instant case the product as claimed can be used in a materially different process of using that product such as, decelerating an automobile, shifting gears or protecting a structure from heating upon atmospheric re-entry.

9. Inventions Group IV and V are related as product and process of use. The inventions can be shown to be distinct if either or both of the following can be shown: (1) the process for using the product as claimed can be practiced with another materially different product or (2) the product as claimed can be used in a materially different process of using that product (MPEP § 806.05(h)). In the instant case the product as claimed can be used in a materially different process of using that product such as a process of accelerating an aircraft.

10. Because these inventions are distinct for the reasons given above and have acquired a separate status in the art as shown by their different classification, restriction for examination purposes as indicated is proper.

11. Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of inventorship must be accompanied by a request under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(i).

### *Specification*

12. The abstract of the disclosure is objected to because the form and legal phraseology often used in patent claims, such as "comprises," should be avoided (see lines 1 and 2). Correction is required. See MPEP § 608.01(b).

### *Claim Rejections - 35 USC § 112*

13. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

14. Claims 1-13 and 20-24 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In claims 1 and 20, the limitation of “the greatest pressure of the second heating is at least” is unclear as to which limit, a maximum or a minimum, Applicants are referring. It is noted that for the purposes of examination it has been assumed that Applicants are referring to a minimum limit, *i.e.*, the pressure of the second heating is at least 15 MPa.

Claims 2-13 and 21-24 are rejected as dependent claims.

***Claim Rejections - 35 USC § 102***

15. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

16. Claims 1-4, 8 and 21-22 are rejected under 35 U.S.C. 102(b) as being anticipated by Economy *et al.* (US Patent No. 5,399,377).

Regarding claims 1-2 and 20-21, Economy *et al.* ('377) teach the claimed process of making a composite material including, providing a borazine oligomer, providing reinforcing fibers (unidirectional aligned fibers or fabric preform) and mixing said borazine oligomer with said fibers to form a mixture in a mold, heating said mixture at a temperature of 50-90 °C (first heating) for a time of 48 hours (first heating), further heating said mixture up to a maximum temperature of 400 °C (second heating), where the molding pressures throughout the process were gradually increased to a maximum pressure of 5 ksi (34 MPa) (at least 15 MPa) and

applying a third heating at 1200 °C (see col. 3, lines 31-51; col. 4, lines 5-56; col. 7, lines 20-21 and col. 8, lines 64-66).

In regard to claims 3 and 22, Economy *et al.* ('377) teach heating a borazine oligomer at 70 °C for 30-35 hours (see col. 3, line 66 through col. 4, line 19).

Specifically regarding claim 4, Economy *et al.* ('377) teach carbon fibers (see col. 3, line 60).

Regarding claim 8, Economy *et al.* ('377) teach a heating rate during the second heating of 30 °C/hr. (0.5 °C/min) (see col. 4, line 40).

### ***Claim Rejections - 35 USC § 103***

17. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

18. Claims 5-7 and 9-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Economy *et al.* (US Patent No. 5,399,377).

Economy *et al.* ('377) teach the basic claimed process as described above.

Regarding claims 5-7 and 9-13, Economy *et al.* ('377) teach heating said mixture at a temperature of 50-90 °C (first heating temperature) for a time of 48 hours (first heating time), further heating said mixture up to a maximum temperature of 400 °C (second heating temperature) using a heating rate of 30 °C/hr. (0.5 °C/min) (second heating rate), where the



molding pressures throughout the process (first and second pressure) were gradually increased to a maximum pressure of 5 ksi (34 MPa) (at least 15 MPa) (first and second pressure) applying a third heating at 1200 °C (third heating temperature) (see col. 3, lines 31-51; col. 4, lines 5-56; col. 7, lines 20-21 and col. 8, lines 64-66). It is submitted that the first heating temperature, the first heating time, the second heating temperature, the second heating rate and the first and second pressure are result effective variables. In re Antonie, 559 F.2d 618, 195 USPQ 6 (CCPA 1977). Therefore, it would have been obvious for one of ordinary skill in the art to have used routine experimentation to determine an optimum level for the first heating temperature, the first heating time, the second heating temperature, the second heating rate and the first and second pressure in the process of Economy *et al.* ('377) because, Economy *et al.* ('377) teaches specific values for said process parameters, hence teaching that said process parameters are result-effective variables.

19. Claim 23 is rejected under 35 U.S.C. 103(a) as being unpatentable over Economy *et al.* (US Patent No. 5,399,377) in view of Lavasserie *et al.* (US 2003/0136502 A1).

Economy *et al.* ('377) teach the basic claimed process as described above.

Regarding claim 23, although Economy *et al.* ('377) teach a three dimensional carbon fiber preform (see col. 7, line 21 and col. 8, lines 64-66), Economy *et al.* ('377) do not teach a needled carbon fiber preform. However, needling a fiber preform prior to forming a ceramic matrix composite is well known as evidenced by Lavasserie *et al.* (US 2003/0136502 A1) who teach that it is well known when making a ceramic matrix composite to use a needled preform (see para. [0010]). Therefore, it would have been obvious for one of ordinary skill in the art to

have provided a needled preform as taught by Lavasserie *et al.* (US 2003/0136502 A1) in the process of Economy *et al.* ('377) because of known advantages such as improved handleability that allows densification without the need of support tooling, hence providing for a simplified process and also because of its well known status.

20. Claim 24 is rejected under 35 U.S.C. 103(a) as being unpatentable over Economy *et al.* (US Patent No. 5,399,377) in view of Lavasserie *et al.* (US 2003/0136502 A1) and in further view of Parlier *et al.* (US Patent No. 6,284,358 B1).

Economy *et al.* ('377) teach the basic claimed process as described above.

Regarding claim 24, although Economy *et al.* ('377) teach a three dimensional carbon fiber preform (see col. 7, line 21 and col. 8, lines 64-66), Economy *et al.* ('377) do not teach a needled carbon fiber preform. However, needling a fiber preform prior to forming a ceramic matrix composite is well known as evidenced by Lavasserie *et al.* (US 2003/0136502 A1) who teach that it is well known when making a ceramic matrix composite to use a needled preform (see para. [0010]). Therefore, it would have been obvious for one of ordinary skill in the art to have provided a needled preform as taught by Lavasserie *et al.* (US 2003/0136502 A1) in the process of Economy *et al.* ('377) because of known advantages such as improved handleability that allows densification without the need of support tooling, hence providing for a simplified process and also because of its well known status.

Further regarding claim 24, although Economy *et al.* ('377) in view of Lavasserie *et al.* (US 2003/0136502 A1) teach a three dimensional carbon fiber needled preform, Economy *et al.* ('377) in view of Lavasserie *et al.* (US 2003/0136502 A1) do not teach a needled CVI-infiltrated

carbon fiber preform. However, CVI consolidation of a fiber preform prior to forming a ceramic matrix composite is well known as evidenced by Parlier *et al.* ('358) who teach that it is well known when making a ceramic matrix composite to use a CVI consolidated preform prior to densification of said preform (see col. 1, lines 23-35 and col. 3, lines 42-60). Therefore, it would have been obvious for one of ordinary skill in the art to have used a CVI infiltration process as taught by Parlier *et al.* ('358) to further consolidate the needed carbon fiber preform in the process of Economy *et al.* ('377) in view of Lavasserie *et al.* (US 2003/0136502 A1) because of known advantages such as improved handleability that allows densification without the need of support tooling, hence providing for a simplified process and also because of its well known status.

### ***Conclusion***

21. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

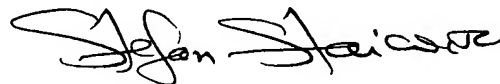
22. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Stefan Staicovici, Ph.D. whose telephone number is (571) 272-1208. The examiner can normally be reached on Monday-Friday 9:30 AM to 6:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael P. Colaianni, can be reached on (571) 272-1196. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 1732

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Stefan Staicovici, PhD

A handwritten signature in black ink, appearing to read 'Stefan Staicovici', written in a cursive style.

Primary Examiner

1/28/06

AU 1732

January 28, 2006